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| **Open the TI-Nspire document *Transformations\_of\_ Logarithmic\_Functions.tns.***In this activity, you will examine the family of logarithmic functions of the form  where and are parameters. | **A screenshot of a computer  Description automatically generated** |

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| The parameter  is the base of the logarithmic function and  Using the sliders in the left panel of each page, change the value of a parameter, and record the effect of each parameter change on the graph of the corresponding logarithmic function. At the end of this activity, use your results to match each function with its corresponding graph.Note: The slider for the base  is constructed to use the specific values in the column labeled **blist** in the Lists & Spreadsheets page. |
| **Move to page 2.1.** |
| 1. The graph of  is shown in the right panel. Click the arrows to change the value of , and observe the changes in the graph of  a. Explain why for every value of  the graph of  passes through the point  b. For  describe the graph of c. For  describe the graph of d. Find the domain and range of function  for all possible values of .e. Describe the behavior of the graph of  near the -axis in words and by writing it in limit notation.  |

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| **Move to page 3.1.** |
| 2. The graph of  is shown in the right panel. For various (fixed) values of  click the arrows to change the value of , and observe the changes in the graph of  Describe the effect of the parameter  on the graph of  |
| **Move to page 4.1.** |
| 3.The graph of  is shown in the right panel. For various (fixed) values of  and  click the arrows to change the value of , and observe the changes in the graph of  Describe the effect of the parameter  on the graph of  |
| **Move to page 5.1.** |
| 4.Consider a logarithmic function of the form  where  is a constant. Use this Graphs Page (without sliders) to interpret the graph of  as a common transformation.a. Display the graphs of  and   (i) How is the graph of  related to the graph of   (ii) Using the properties of logarithms, rewrite the function  in terms of  to justify your answer.  (iii) Describe the two equivalent transformations that $f2\left(x\right)= log\_{4}(16x)$ performs on the parent  function $f1\left(x\right)= log\_{4}x$.b. Display the graphs of  and   (i) How is the graph of  related to the graph of   (ii) Using the properties of logarithms, rewrite the function  in terms of  to justify your  answer. (iii) Describe the two equivalent transformations that $f2\left(x\right)= log\_{3}\left(\frac{x}{27}\right)$ performs on the parent  function $f1\left(x\right)= log\_{3}x$. |
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| 5. Without using your calculator, match each equation with its corresponding graph below.(a)  (b)  (c)  (d)  (e)  (f)  |
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| (i) | Description: Transformations_of_Logarithmic_Functions_5_1f | (ii) | Description: Transformations_of_Logarithmic_Functions_5_1e |
| (iii) | Description: Transformations_of_Logarithmic_Functions_5_1b | (iv) | Description: Transformations_of_Logarithmic_Functions_5_1a |
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| (v) | Description: Transformations_of_Logarithmic_Functions_5_1d | (vi) | Description: Transformations_of_Logarithmic_Functions_5_1c |

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